

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A casting nozzle having a molten steel flow hole portion, in which a plurality of independent members comprising at least one of protrusion portions ~~and/or~~ and concave portions discontinuous in both directions parallel and perpendicular to a molten steel flowing direction are disposed, wherein each of said protrusion portions ~~and/or or the~~ concave portions has a size satisfying ~~the following expressions (1) and (2):~~

$$H \geq 2\text{mm} \text{ (unit: mm)} \quad \text{---expression (1)}$$

$$L > 2 \times H \text{ (unit: mm)} \quad \text{---expression (2)}$$

in which "~~H~~" ~~shows the H~~ is a maximum height of the protrusion portion or ~~the a~~ maximum depth of the concave portion, and "~~L~~" ~~shows the L~~ is a maximum length of a base portion of the protrusion portion or the concave portion,

wherein the independent members make an inner surface area of the molten steel flow hole portion rough so that an inner diameter of the molten steel flow hole portion becomes variable over the inner surface of the rough area.

2. (currently amended): The casting nozzle according to claim 1, wherein each of said protrusion portions ~~and/or or the~~ concave portions satisfies an ~~the following~~ expression (3):

$$L \leq \pi D/3 \text{ (unit: mm)} \quad \text{---expression (3)}$$

in which "~~L~~" ~~shows L~~ is the maximum length of a base portion of the protrusion portion or the concave portion, and "~~D~~" ~~shows D~~ is the inner diameter (diameter) of the nozzle before the protrusion portions or concave portions are disposed (~~π : the ratio of the circumference of a circle to its diameter~~).

3. (currently amended): The casting nozzle according to claim 1, wherein said protrusion portions ~~and/or or the~~ concave portions are disposed so that ~~the an~~ inner surface area of a molten steel flow path in a range in which said protrusion portions ~~and/or or the~~ concave portions are disposed is 102-350 % as large as ~~the an~~ inner surface area of the molten steel path before disposition of said protrusion portions ~~and/or or the~~ concave portions.

4. (currently amended): The casting nozzle according to claim ~~1-1~~₁, wherein said casting nozzle has a portion where said protrusion portions ~~and/or or the~~ concave portions are disposed in a so-zigzag pattern so that positions of corresponding protrusion portions or concave portions are displaced at least in the direction perpendicular to the molten steel flowing direction.

5. (currently amended): The casting nozzle according to claim 1, wherein said protrusion portions ~~and/or or the~~ concave portions are disposed ~~in the whole over an entire or a~~ part of the molten steel flow hole portion of the casting nozzle.

6. (currently amended): The casting nozzle according to claim 1, wherein said protrusion portions ~~and/or or the~~ concave portions are disposed ~~so as to~~ be not higher than a meniscus of the casting nozzle.

7. (currently amended): The casting nozzle according to claim 1, wherein ~~the a~~ distance between the bases of said protrusion portions in ~~the a~~ direction parallel to the molten steel flowing direction is ~~not smaller equal to or greater~~ than 20 mm.

8. (currently amended): The casting nozzle according to claim ~~1-1~~₁, wherein the height of each of said protrusion portions is 2-20 mm.

9. (currently amended): The casting nozzle according to claim ~~1-1~~₁, wherein ~~the a~~ number of said protrusion portions disposed in the molten steel flowing hole portion is equal to or greater not smaller than 4.

10. (currently amended): The casting nozzle according to claim 1-1, wherein the an angle ~~“angle-between a nozzle inner pipe and a lower end portion of each of said protrusion portions”~~ portions in a ~~the~~ direction parallel to the molten steel flowing direction is ~~not larger~~ equal to or less than 60°.

11. (currently amended): The casting nozzle according to claim 1-1, wherein said protrusion portions are molded so-as-to be integrated with a body of the casting nozzle.

12. (previously presented): The casting nozzle according to claim 1, wherein said casting nozzle is an immersion nozzle for continuously casting steel.

13. (new): The casting nozzle according to claim 1, wherein the inner rough area of the molten steel flow hole portion is generally one of circular and elliptical.

14. (new): The casting nozzle according to claim 13, wherein a cross-section of the inner rough area in the direction perpendicular to the molten steel flowing direction comprises discontinuous circumferential segments.